

Cotton Region Districts.—Continued.

Districts and Centers.	STATIONS.	
	Where.	On what railroad.
Memphis.	Grand Junction, Tenn.	Memphis and Charleston.
	Corinth, Tenn.	
	Tusculum, Ala.	
	Decatur, Ala.	
	Scottsborough, Ala.	
	Withe, Tenn.	Louisville and Nashville.
	Brownsville, Tenn.	
	Milan, Tenn.	
	Paris, Tenn.	
	Erin, Tenn.	
	Clarksville, Tenn.	Nashville, Chattanooga and Saint Louis.
	Nashville, Tenn.	
	Hernando, Miss.	Mississippi and Tennessee.
	Batesville, Miss.	
	Grenada, Miss.	

RELATIVE HUMIDITY.

The mean relative humidity for the month ranges as follows in the several districts:

New England, from 57 to 76; middle Atlantic states, 53 to 75; south Atlantic states, 66 to 81; Florida peninsula, 71 to 74; east Gulf states, 67 to 78; west Gulf states, 63 to 83; Rio Grande valley, 57 to 82; Ohio valley and Tennessee, 57 to 66; lower lake region, 64 to 72; upper lake region, 67 to 77; extreme northwest, 74 to 80; upper Mississippi valley, 55 to 71; Missouri valley, 62 to 70; northern slope, 61 to 66; middle slope, 44 to 60; southern slope, 33 to 66; southern plateau, 30 to 37; middle plateau, 43 to 53; northern plateau, 53 to 75; north Pacific coast region, 70 to 76; Middle Pacific coast region, 59 to 73; south Pacific coast region, 36 to 74. High stations report the following percentages not corrected for altitude: Cheyenne, Wyoming, 49.6; Pike's Peak, 83.0; Santa Fé, 36.6; Mt. Washington, 86.6.

WINDS.

The prevailing winds during the month of April at Signal Service stations are shown on chart number ii by arrows flying with the wind:

On the New England and middle Atlantic coasts the winds are northwest to southwest. In the south Atlantic states, from southeast to southwest, except at Hatteras, Kittyhawk and Norfolk, where they are northeasterly. In the Gulf states, Indian territory, Tennessee, and Kansas, southerly winds prevail, while in the Ohio, upper Missouri and Mississippi valleys, the winds are generally from north to east. South to west winds prevail on the north Pacific coast, and west to northwest in northern California. In the plateau regions the winds are generally from south to west.

TOTAL MOVEMENTS OF THE AIR.

The following are the largest total movements at Signal Service stations: Mount Washington, 22,005 miles; Pike's Peak, 16,938; Hatteras, North Carolina, 12,935; Portsmouth, North Carolina, 12,702; Kittyhawk, North Carolina, 11,854; New Shoreham, Rhode Island, 11,552; Indianola, Texas, 11,098; Sandusky, 11,093; Dodge City, Kansas, 11,109; Fort Elliott, Texas, 10,712; Sandy Hook, New Jersey, 10,305; Champaign, Illinois, 10,057; Bismarck, Dakota, 10,035; Huron, Dakota, 10,010; Cape Henry, Virginia, 9,757; Barnegat, New Jersey, 9,680; Milwaukee, Wisconsin, 9,646; Grand Haven, Michigan, 9,580; Galveston, Texas, 9,551; Cape May, New Jersey, 9,432; North Platte, Nebraska, 9,412; West Las Animas, Colorado, 9,344; Moorhead, Minnesota, 9,286; Macon, North Carolina, 9,204; Fort Keogh, 9,163; Rochester, 9,106; Port Eads, Louisiana, 9,040; Yankton, Dakota, 9,032; Henrietta, Texas, 9,016; Eagle Rock, Idaho, 8,702; Punta Rasa, 8,632; Madison, Wisconsin, 8,613; Concho, Texas, 8,363; Oswego, New York, 8,267; Boston, Massachusetts, 8,239; De-

troit, Michigan, 8,072; Santa Fe, New Mexico, 8,068; Chincoteague, Virginia, 8,035; Port Huron, Michigan, 8,003. The smallest are: Lynchburg, Virginia, 2,676; Lewiston, Idaho, 2,692; Augusta, Georgia, 2,739; Los Angeles, California, 2,786; Florence, Arizona, 2,947.

HIGH WINDS.

On the summit of Mount Washington the maximum velocity, 120 miles, n.w., on 22d. Velocities of 100 miles, n.w., occurred on the 2d, 13th and 18th. Velocities of 50 miles, or over, occurred as follows: 92 miles, n.w., 17th; 90, n.w., 4th; 86, n.w., 16th; 81, n.w., 7th; 80, n.w., 8th; 75, n.w., 21st; 68, s.w., 1st; 68, n.w., 30th; 66, n.w., 23d; 60, n.w., 12th and 20th; 60, s.e., 19th; 58, n.w., 5th; 55, n.w., 29th; 52, n.w., 14th; 50, n.w., 9th.

On the summit of Pike's Peak, Colorado, the maximum velocity, 64 miles, s.w., occurred on the 25th; other high velocities occurred as follows: 60 miles, s.w., on the 20th and 24th; 58, s.w., 3d; 56, n.w., 8th; 52, s.w., 23d; 50, s.w., 19th.

Other stations reporting velocities of 50 miles per hour, or over, are as follows: Eagle Rock, Idaho, 55 miles, s.w., 19th; Fort Keogh, 50, w., 26th; Dodge City, Kansas, 52, s., 17th; Palestine, Texas, 50, w., 22d; Toledo, 50, e., 23d; Kittyhawk, North Carolina, 51, w., 10th; Hatteras, North Carolina, 56, n.e., 10th; Portsmouth, North Carolina, 66, n.e., 10th, 52, s.w., 23d.

LOCAL STORMS.

Palestine, Texas, 22d, violent storm; wind reaching maximum velocity of fifty miles; much damage done in this city to fences, buildings, etc. Sandusky, Ohio, 23d, destructive gale, reaching its height at 2:15 a. m. The schooner "Gallatin," while off Cleveland, sprung a leak and the high wind caused her to fill rapidly. She became unmanagable and went ashore on Chickanola reef and sank. During the gale there were thirty vessels sheltered at Kelly's Island; all of them were more or less damaged. At Marblehead, seven docks were washed away. The damage by this storm, to fishing interests was very great.

Topeka, Kansas, 6th, during evening, a tornado started near Raymond in Rice county, moved in a northerly direction and prostrated the telegraph poles, when it crossed the Santa Fe railroad track. In this neighborhood several buildings were demolished, one person was killed and another fatally injured. Proceeding northward the storm struck the town of Chase, demolishing twenty out of thirty-six buildings and threw railroad cars from the track; three persons were killed and one fatally injured. At the same time another small tornado passed through the eastern part of the county, but did but little damage. In some places the wind sucked all of the water out of wells. As the storm-cloud approached Chase it was of funnel-shape, whistling and twisting with great velocity. Many of the inhabitants are more or less injured, but few escaping without hurt of some kind. The people are living in box-cars and many families are in destitute conditions.

At Strafford, Kansas, a village of about eighty houses, about two hundred miles southwest of Topeka, all but two houses were blown down; one man was killed and several persons were, more or less, injured. Reports from Keosauqua, say great damage was done throughout the lower Des Moines valley. At Keosauqua one house was demolished and several others injured; tress and fences blown down in all directions. At Ashton, Missouri, same date, a tornado did great damage; four houses were demolished and others suffered loss of chimneys and roofs.

Detroit, 6th, between Clyde and Highland, near the Flint and Pere Marquette railway, about forty miles from Detroit, about 8 p. m., a violent tornado occurred; houses were destroyed and a number of lives were lost. In Alamo township, Kalamazoo county, houses and barns were unroofed, two persons were killed and another injured. The storm struck this section between 5 and 6 p. m., and moved eastward across the northern part of the country.

At Otsego, Allegan county, Michigan, the storm was very

severe and was accompanied by hail and vivid lightning. From the westward of this place, the storm could be distinctly seen curveting in the sky. After leaving Allegan and Kalamazoo counties, the storm passed across the northwest corner of Calhoun county, and across the southern part of Barry county, where in the latter it struck near Hickory Corners, in Johnstown township about five-thirty p. m., and was accompanied by the heaviest hail ever known in that section; doing great damage to orchards and breaking windows. Its course was from west to east and every thing in its track was demolished. The width of track where the greatest damage was done, is from forty to fifty rods. Inside this expanse it cleared everything, leaving a course as decidedly marked as the path of a reaper through a field of grain. Outside the immediate path, the damage was slight on either side; and at a quarter of a mile distant no damage was done. A number of dwellings, barns and other buildings were blown down or unroofed. Several persons were injured.

At Bedford Centre, Calhoun county, the tornado was seen in a northerly direction. In the form of a funnel-shaped cloud with the vortex downward, moving to the northeast, and seemed to lower itself to the earth, again ascend and move onward in the upper regions. It passed through the township of Kalamo, Eaton county, within a mile of Charlotte, sweeping everything in its path, which was from four to twenty rods in width. The largest trees were twisted off from four to thirty feet from the ground and carried considerable distances. A number of dwellings were totally destroyed, together with numerous other buildings. Several lives were lost and many persons injured. Many persons, seeing its approach, took refuge in their cellars and thus escaped bodily injury. The damage at this place is estimated at one hundred thousand dollars. In this vicinity the tornado was accompanied by hail sufficiently large to break windows.

In Ingham county the tornado struck the southeasterly corner in the northern part of White Oak township, accompanied by hail and thunder. Several houses were totally destroyed; one man was instantly killed by a piece of timber; a number of sheep were killed by falling timbers of the barn in which they were sheltered. A pond near the barn, in which the water was several feet deep, was emptied of all the water. In Livingston county no damage has been reported.

A 5 p. m., Mount Pleasant, Isabel county, was struck by a severe hail storm; some of the stones were an inch and a half in diameter; one was picked up that measured six inches in circumference. In Midland county, several dwellings, barns and other buildings were destroyed; one person killed and several injured. Its course was in an easterly direction, and its path not more than one-quarter of a mile wide. The tornado struck Bay county about 6 p. m., causing great destruction in the townships of Williams, Beaver and Kawkawlin. In Angres township the damage was less serious. It passed through three miles of timber and scarcely left a tree standing.

Port Huron Michigan, 9th., 12 m., during gale a sail-boat was capsized and sunk. Cairo, Illinois, 22d, about 4.40 p. m., a violent tornado struck this city. It first struck this vicinity near Charleston, Missouri, about twelve miles south-southwest of Cairo, where fences were blown down and trees uprooted for a distance of about one and a-half miles in length and three-fourths of a mile in width. Its first appearance was in the northern part of the city. Its path over the city was about one mile wide. In the northern part of the city, four empty freight cars were blown from the track; many houses were unroofed, chimneys and trees blown down. Two hundred feet of wooden sidewalk was lifted and carried a distance of one hundred feet. In another place thirty feet of heavy oak sidewalk, twenty feet in width, was taken up and carried a distance of sixty feet, breaking down a telegraph pole in its course. A large gas-holder, sixty feet in diameter, was struck and overturned, the heavy iron columns supporting the tank were torn off and broken. Persons and animals were taken up and carried considerable distances. The damage done in Cairo is estimated at \$30,000.

In east Cairo, Kentucky, a transfer building, three hundred feet long, was completely demolished. Beyond this place the tornado lifted from the earth and continued its north-northeasterly course, descending at a point about five miles distant, where it swept over a farm blowing down and uprooting large trees, demolishing fences, etc. From this place it again ascended and not strike the earth until it reached a point a little west of Carmi, Illinois, where it was very destructive. In this vicinity a double log house was totally demolished; other houses and out-buildings were blown down or unroofed; orchards and many miles of fencing were destroyed. No damage was done in Carmi.

Springfield, Illinois, 6th, severe storm of rain, hail, and thunder; several barns in vicinity were unroofed or blown down together with trees, fences, signs, etc. No damage was done in the centre of the city.

Smithville, Dakota, 21st, very heavy, rain and snow storm accompanied by high wind. Fifteen miles of telegraph line between Smithville and Rapid City were prostrated.

Dodge City, Kansas, 6th, reports from Lyon, a small town about one hundred miles east of this city, say that the town was nearly destroyed by a tornado on the 5th instant. Two persons are reported to have been killed.

Dana, Iowa, 8th, about five p. m. a tornado passed near station, accompanied by rain and hail, destroying buildings and doing other damage.

Savannah, Georgia, 24th, a tornado of destructive force occurred near Macon, Georgia, on night of 23d instant; several lives were lost and considerable property destroyed.

Evergreen, Indiana, 19th, about twelve thirty a. m. a destructive tornado visited this place, seventeen buildings were destroyed, many others injured. The damage in Evergreen is estimated at thirty-five thousand dollars.

The observer at Des Moines sends the following report of the tornado which originated opposite Sheldahl, Iowa, on the evening of the eighth and moved in a northerly direction, passing about one mile north of Ames, Iowa: "The average width of path was about 300 feet, and its length about 12 miles. A number of buildings in its path were destroyed; the Agricultural college was unroofed, trees were torn up by the roots, and fences and light buildings were blown away."

New Orleans, 18th.—During the evening a severe tornado visited the southern part of this parish. In the city proper, except a few signs that were blown down and a few limbs blown from the trees, but little damage was done. At Carrollton, at 6.30 p. m., it could be seen coming in a northwesterly direction from a point about a mile distant on the other side of the river. In an instant it struck the river, raising from it a quivering column of water sixty feet high. It struck the ferry-wharf, lifting it from the river and landing it some distance on the bank in a demolished condition. Many dwellings were blown down or unroofed; several persons were injured by falling timbers. The damage to property is estimated at \$25,000.

Morgan City, Louisiana.—During the night of the 13th this section was visited by a most terrible storm, causing the water to rise and destroying an immense amount of property. The Ramos railroad bridge was carried away, and at Drew's Mills about twenty dwellings were destroyed; only one house remained standing. Along Bayou Teche cabins and other small buildings were destroyed on every plantation. In Berwick a school house was blown from its foundation and two men killed by the falling timber. Many persons narrowly escaped drowning. The destruction of live-stock throughout a large section of country is very great. A sugar house in Saint Charles parish was blown down and a man killed. At Fausse Point forty houses were swept away, and the loss of stock, crops, etc., is enormous.

On the 19th a terrible tornado struck Brownsville, Missouri, completely destroying a large part of the town. Eleven persons were killed and one hundred and fifty injured. Over fifty houses in the heart of the town were demolished. The

storm struck the town at 4 p. m.; large two-story brick buildings were lifted from their foundations and the ruins scattered in all directions; frame dwellings were overturned and crushed into splinters; large trees were uprooted and carried long distances; and animals were picked up, carried various distances, and dropped lifeless along the path of the storm. Just before the funnel-shaped cloud struck the town, a loud roaring noise was heard, which was followed by several loud electrical explosions. The funnel-shaped mass had a rapid rotary motion, drawing within its vortex everything with which it came in contact. The storm-track was about two hundred yards wide, with a zigzag course from southwest to northeast.

At Benick, Randolph county, about 6 p. m., sixty miles northeast of Brownsville, a tornado exhibited considerable violence, which was attended by a whirling motion.

At Montrose, Henry county, 4.10 p. m., a violent tornado did much damage.

In Reynolds county, Missouri, on the 8th, at 6 p. m., a small tornado, about one hundred yards wide, swept everything clean in its path. The same locality was visited by the memorable tornado of 1850.

Pennsville, Pennsylvania, on the 19th: a severe storm burst suddenly on this community about 4 p. m.; it was of short duration and very limited in its track. It moved from southwest to northeast, passing over the northern part of Fayette county. The destruction by this tornado has never before been equalled by any like occurrence. Buildings were demolished or unroofed; chimneys, fences and trees blown down; and a number of persons were injured, some of whom have since died.

New Orleans, April 22d, a tornado swept across the Chicago, Saint Louis and New Orleans railroad, between Summit and Bayou Chitto, Mississippi, prostrating telegraph poles on both sides of the track for a distance of one mile and uprooting trees, many of them falling across the railroad.

Monticello, a town twenty miles east of Brookhaven at 12:15 p. m., was nearly destroyed—only three houses, on the outskirts, being left. Nothing before has ever been experienced, like this, at this place. Ten persons were killed instantly. Out of a population of one hundred and fifty, very few escaped without injury. A fine residence, four miles west of Monticello, was entirely destroyed.

Natchez, Mississippi, 19th, about nine p. m., a storm of great severity burst upon the city, continuing for a few minutes, during which time it wrecked buildings, uprooted trees, prostrated fences and tore signs from their fastenings, while the accompanying rain deluged cellars, doing an incalculable amount of damage. Great damage was done to fruit and spring vegetables by the hail. The course of the storm was from northwest to southeast.

Abilene, Kansas, 7th, heavy rain and wind storm doing considerable damage in the eastern and southwestern parts of Dickinson counties.

At Chapman, a church was demolished; roofs of several houses were blown off; barns and other buildings damaged.

At Woodbine, a church, three buildings and a blacksmith shop were demolished.

On Holland creek, eighteen miles southwest from Abilene, considerable damage was done. This storm struck the counties at the southwest corner and traveled in a northeasterly course.

On the same date, at Rosalia township, in Butler county, Kansas, 10.30 p. m., three houses were overturned, one man killed and several persons injured. The storm was from southwest to northeast.

Junction City, Kansas.—About midnight a tornado passed over this neighborhood from the southwest which was very destructive.

At Fort Riley, Kansas, most of the buildings were unroofed and a portion of the walls destroyed, involving a loss of from \$25,000 to \$30,000. At Wakefield, Clay county, eight houses were destroyed. In all parts of the county, barns, out-houses and fences were destroyed.

Maysville, Kentucky, 28.—A tornado has caused great destruction on Tuckehoe ridge; several large tobacco houses were blown down and their contents scattered. At Lawrence, a brick church was unroofed and one end blown in; a school-house, two dwellings and a number of barns and out-buildings were destroyed. The storm was the most violent ever known in this section.

VERIFICATIONS.

INDICATIONS.

The detailed comparison of the tri-daily indications for April, 1882, with the telegraphic reports for the succeeding twenty-four hours, shows the general average percentage of verifications to be 84.9 per cent. The percentages for the four elements are: Weather, 87.1; Direction of the Wind, 88.1; Temperature, 84.1; Barometer, 79.1 per cent. By geographical districts they are: For New England, 82.6; middle Atlantic states, 85.0; south Atlantic states, 84.4; east Gulf states, 87.4; west Gulf states, 86.0; lower lake region, 86.2; upper lake region, 83.8; Tennessee and the Ohio valley, 83.1; upper Mississippi valley, 83.9; lower Missouri valley, 84.1; northern Pacific coast region, 94.1; middle Pacific coast region, 78.0; southern Pacific coast region, 98.6.

There were 96 omissions to predict (38 being due to the absence of reports from the Pacific coast) out of 3,690, or 2.33 per cent. Of the 3,594 predictions that have been made, 98, or 2.73 per cent., are considered to have entirely failed; 102, or 2.84 per cent., were one-fourth verified; 397, or 11.04 per cent., were one-half verified; 673, or 18.73 per cent., were three-fourths verified; 2,324, or 64.66 per cent., were fully justified, so far as can be ascertained by the tri-daily reports.

CAUTIONARY SIGNALS.

One hundred and ninety-five cautionary signals were displayed during the month of April, of which one hundred and sixty-eight, or 86.1 per cent., were justified by winds of twenty-five miles per hour, at, or within, one hundred miles of the station. Thirteen "off-shore" signals were displayed, of which nine, or 69.2 per cent., were fully justified; twelve, or 92 per cent., were justified as to velocity; and ten or 76.9 per cent., were justified as to direction; Of all kinds displayed, there were two hundred and eight, of which one hundred and seventy-seven, or 85.1 per cent., were justified. Thirteen cautionary signals were changed to "off-shore" signals. The above does not include signals ordered at sixty-nine display stations, where the velocity is estimated only.

NAVIGATION.

STAGE OF WATER IN RIVERS.

In the table on the right hand of chart number iii., are given the highest and lowest stages of water observed at Signal Service stations during the month of April. At stations in the lower Mississippi it will be seen that the water has fallen from the first of the month, when it was above the danger-line at Cairo and Vicksburg, and only five inches below the danger-line at Memphis. At the close of the month it had fallen at all stations south of Cairo, but remained two feet above the danger-line at Vicksburg. At stations in the upper Mississippi the highest water occurred between the twentieth and thirtieth. On the twenty-fifth, at Keokuk, it was two feet and two inches above the danger-line, or sixteen feet eight inches on the gauge. The lower Missouri reached its maximum about the tenth of the month, and was at its minimum height from the third to fifth. The Ohio was highest at Pittsburg on the twenty-eighth, and highest at Louisville and Cincinnati from the first to the third of the month.

ICE IN RIVERS AND HARBORS.

Lake Champlain: Burlington, Vermont, 5th, steamer "Williams" left this port for Plattsburg, New York, but was unable